

that fact, he will be a bold prophet who will venture to affirm what may not be done in seven years more.

I shall not presume to say that at the present moment the wireless telegraph service between London and New York is as efficient and as rapid as that supplied by the cables. For nearly fifty years the Transatlantic cable organisation has been in existence, and there are now sixteen cables working across the North Atlantic, so that in the case of a breakdown of one cable the traffic is sent by one of the others. Moreover, long experience has served to bring their land-line connections to a high state of perfection. Nevertheless, I am convinced that if there were only one cable and the present wireless service, interruptions would be more frequent and much more serious in the case of the cable than in that of the wireless service.

We have only to look towards those parts of the globe such as India, South Africa, and so forth, where trans-oceanic communication is dependent upon only one or two cables, and the force of my remarks will be more readily appreciated. The cases of delay in regard, not only to commercial messages, but also to Government despatches, are only too frequent, as no doubt you have observed from time to time in the daily Press.

Among many people there seems to be a rooted conviction that wireless telegraphy is not suitable for the handling of code or cipher messages. Whatever gave rise to this idea I do not know, but I wish to emphasise that it is purely fictitious. Code messages can be sent just as well by wireless as by ordinary methods of telegraphy.

I need hardly say that most of the wireless messages passing between warships are now expressed in code, as are likewise the majority of the commercial messages handled by the Clifden and Cape Breton stations.

I do not wish to claim that wireless telegraphy is infallible, and although errors do sometimes occur, it is absolutely certain that, having regard to the London and Montreal service, most of the mistakes can be traced to the land-line telegraph transmission between London and Clifden, and between Glace Bay and Montreal.

I find, however, that probably the greatest ignorance prevails in regard to what is termed "tapping," or intercepting wireless messages. No telegraph system is secret. The contents of every telegram are known to every operator who handles it. It is incorrect to suppose that anyone can at will pick up wireless messages. On the other hand, it is easy for anyone knowing the Morse code to step into many telegraph offices and read off the messages by the click of the instruments.

Further, it is practicable, but illegal in this country, to make arrangements so that messages which pass over a telegraph line can be read by persons who are not operating the line at all. It is also expensive to erect a tall pole or tower and fix up all the instruments which are necessary before wireless messages can be taken in, and, moreover, such proceeding is contrary to the law of the land.

It should be remembered, too, that any ordinary telegraph or telephone wire can be tapped, and the conversation going through it overheard, or its operation interfered with. Results published by Sir William Preece show that it is possible to pick up at a distance, on another circuit, the conversation which may be passing through a telephone or telegraph wire.

At Poldhu, on a telephone connected to a long horizontal wire, the messages passing through a Government telegraph line a quarter of a mile away can be distinctly read. In a paper on his method of magnetic space telegraphy, Sir Oliver Lodge mentions an occasion on which he was able to interfere, from a distance, with the working of the ordinary telephones in the city of Liverpool.

Many instances can be enumerated showing that electric light and tramway power-stations have interfered with cables and land-lines. Nevertheless, there are penalties attached to the tapping of a telegraph wire, and it ought to be as well known that, since the passing of the Wireless Telegraphy Act, there are penalties involved if any wireless stations are erected or worked without the consent of the Postmaster-General. In conclusion, I may say that I am very confident that it is only a question of time, and that not a very long time, before wireless telegraphy over great distances, possibly round the world, will become an indispensable aid to commerce and civilisation.

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UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

CAMBRIDGE.—Applications to occupy the University's table in the zoological station at Naples should be addressed to Prof. Langley on or before Thursday, May 20.

Mr. C. L. Boulenger has been appointed assistant to the superintendent of the museum of zoology from March 15 to September 30.

Mr. G. I. Taylor has been appointed assistant demonstrator of experimental physics for five years from January 1, 1909.

The Anthony Wilkin studentship in ethnology and archæology will be available at the end of 1909. Applicants should send their names, qualifications, and a statement of the research which they wish to undertake to the Vice-Chancellor before November 1.

OXFORD.—A new departure was taken in Oxford some time ago by the establishment of a department of forestry. A site for the necessary building was provided by St. John's College on a plot of ground adjoining their own gardens, and the work of the department was placed under the direction of Prof. W. Schlich, F.R.S., formerly of Coopers Hill. Coincidentally with this movement, the chair of rural economy, founded by John Sibthorpe, who in 1747 succeeded Dillenius as professor of botany, was re-endowed and put on a new footing by the liberality of the same college. A building for the use of the present occupant of the Sibthorpeian chair, Prof. W. Somerville, was also provided by St. John's College, this, together with the new quarters of the forestry department, forming a handsome block nearly opposite the University museum. The combined structure was opened on April 20 by the Vice-Chancellor, the president of Magdalen, in the presence of a large company, which included Sir Thomas Elliott, Sir Charles Crosthwaite, Mr. Rider Haggard, and many resident members of the University. The president of St. John's, who is now in his ninetieth year, was unfortunately prevented from being present by slight indisposition. In his speech at the opening ceremony the Vice-Chancellor dwelt on the traditions associated with the names of Sibthorpe and Dillenius, and referred in appreciative terms to the services rendered by St. John's College to the scientific studies of the University.

UNDER the Irish Universities Act, 1908, a professor of botany will be appointed shortly for the Queen's University of Belfast. Other appointments will include readerships or lectureships in physics, organic chemistry, bio-chemistry, and geology and mineralogy.

IN furtherance of the movement for the establishment of a National Aeronautical College, we learn from the daily papers that the Aerial League has appointed a sub-committee consisting of Dr. Hele Shaw, F.R.S., Mr. Arthur du Cros, M.P., Lord Montagu of Beaulieu, Sir Buchanan Scott, and Mr. Stephen Marples. We are glad to see that the promoters are keenly alive to the importance of placing the movement on a strictly scientific basis, and that the mathematical side of the problem is to receive its due share of attention. This is the more important as the practical experimental side is pretty certain to be efficiently represented. That a serious effort is being made to wake up our country in the present connection may be gathered from the following remarks of Mr. Marples as reported in the *Standard*:—"Our object," he said, "is to prevent Great Britain from being beaten in aeronautics by foreign countries in the same way as we have been in commercial enterprise. France and Germany have had their technical and commercial colleges, which have produced such good results, and now they have their aeronautical colleges in full swing. Unless we have one we shall fall behind in aeronautics too. Aeronautics is a most scientific subject, and goes more deeply into higher mathematics than any other subject connected with engineering. Hence the great necessity for putting the college on a sane, sound, and businesslike footing to meet the needs of the moment. It is no use teaching even the practice of flying unless we have something of the theory. We hope that the Government will help us. We are also appealing to the public for money."

On July 12, 1908, King Edward VII. and Queen Alexandra visited Sheffield and opened the new University buildings. On the day of the King's visit Mr. Wm. Edgar Allen gave 10,000*l.* to the University on the sole condition that it should be used for the erection of a building for the University library. On Monday, April 26, to the great satisfaction of the University authorities and of the people of Sheffield and district, the Prince and Princess of Wales opened the Edgar Allen Library. At a special Congregation honorary degrees of Litt.D. were conferred on His Royal Highness and on Mr. Wm. Edgar Allen, the donor of the library. During the ceremony the Chancellor, the Duke of Norfolk, announced that Mr. Allen had that morning given donations of 5000*l.* to the Royal Infirmary and 5000*l.* to the Royal Hospital, on condition that a ward or wing in each should be called after the Prince and Princess respectively, a condition their Royal Highnesses were pleased to accept. The educational value of these fresh gifts was aptly referred to by the Chancellor, who pronounced them "a very thoughtful work in connection with this University, because it is undoubtedly a fact that the medical students of this University derive great advantages from what they can learn and see at the great hospitals of this city." The Prince, in the course of an interesting speech, said:—"The great development of the university movement is a remarkable feature in the march of education during the latter part of the nineteenth century. Our important industrial centres recognise that there are problems to be solved differing widely from those dealt with in the more ancient universities. Sheffield was quick to see the necessity of adapting herself to the industrial needs of the people, and to realise that scientific and technical knowledge is indispensable to success in the strenuous commercial struggle among the nations of the west. Thanks to the liberality of Mr. Mark Firth, the college which bore his name was founded in 1879, and incorporated twenty-six years later with those other institutions which constitute the University of Sheffield, including among them schools of engineering and metallurgy which are famous throughout the land. . . ."

The Lord Mayor will preside at a meeting, to be held at the Mansion House as we go to press, in support of the National League for Physical Education and Improvement. The speakers will include the Bishop of Ripon, the Duke of Argyll (probably), Lord Halsbury, Lord Ashbourne, Sir Henry Craik, M.P., and others. The following report, prepared by a strong and representative committee organised by the league, will be presented and discussed:—(1) That physical education should be compulsory in all schools, subject to the conditions of sections (2) and (3). (2) That medical inspection and report should be compulsory as a preliminary to pedagogical gymnastics and at intervals thereafter; the report to make special reference to the conditions of eyes, ears, teeth, lungs, and heart, and to be drawn up on an authorised form to be supplied to the medical officer. A special report should also be made on the return of a pupil after severe illness. That a local education authority does not adequately carry out its duties in regard to medical inspection unless provision is made for this. (3) That there should be regular pedagogical gymnastics at the schools, the number of lessons, the duration of each, and the nature of the exercises to be adapted to the age and physical condition of the child, the time so allotted not to curtail the play hours, games being an important part of physical education. The committee consider that, when possible, this instruction should be carried out daily, though they recognise that for the present this may be impossible, and that three days a week should be the minimum. They consider that, as far as possible, exercises not demanding apparatus should be carried out in the open air. (4) That in all secondary and intermediate schools specially trained gymnastic specialists should be appointed; in elementary schools, where the physical education is necessarily carried out by ordinary school teachers, such teachers should possess a qualification in physical training. (5) The studies of gymnastic specialists should be carried out on the general lines of the Swedish system, with such modifications as are necessitated by the different conditions of school life in this country; recognition to be made of

various grades of qualifications, and corresponding differences in the course of study required. (6) The studies of the gymnastic specialist should embrace anatomy, physiology, hygiene, mechanics, and pedagogics. (7) For the present, certificates of efficiency as teachers will have to be granted or approved by a central body, whether or not in the future these powers can be delegated to universities or other local bodies. (8) The committee have considered the question of a central institute, and are of opinion that, although such an institute is highly desirable, they are not in a position at present to give definite recommendations in regard to its formation.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, April 22.—Sir Archibald Geikie, K.C.B., president, in the chair.—"Dynamic" osmotic pressures: the **Earl of Berkeley** and E. G. J. **Hartley**.—(1) The theory of ancestral contributions in heredity; (2) the ancestral gametic correlations of a Mendelian population mating at random: Prof. Karl **Pearson**. The purpose of these two papers is to place in a somewhat clearer light the relationship of the biometric to the Mendelian standpoint. The law of ancestral heredity, as stated by the present writer in a paper published many years ago in the Proc. Roy. Soc., involved the following three points:—(a) the linearity of the regression of offspring on any ancestor; (b) the diminution of the ancestral correlations in a geometrical progression; and (c) the determination of the probable character of the offspring, when the mating was at random, by the multiple regression formula. It was shown, in a memoir of 1896, that when the ancestral correlations were of the type $\rho, \rho^2, \rho^3 \dots$ then the character of the offspring depended only on the characters of the two parents, and ancestry need not be considered. In a memoir in vol. cciii. of the Phil. Trans. it was shown later that (a) and (b) held for a generalised Mendelian population, for the *somatic* characters, but that the *somatic* correlations were not of the type $\rho, \rho^2, \rho^3 \dots$ and accordingly that ancestry, in the biometrician's sense, did matter even in a population following the simplest Mendelian formula, providing the mating was at random. A recent paper in the Proc. Roy. Soc. might be interpreted as meaning that the law of ancestral heredity did not apply to a Mendelian population. In the first of the above papers the writer indicates how, in a population originally consisting of p dominants, s recessives, and q hybrids, mating at random, the percentage of the number of dominants in the offspring increases with the number of dominants in the grandparentage, and this is true in the case of any grade of ancestors, whatever be p, q , and s . In the second paper the writer turns from the *somatic* to the *gametic* correlations, which were not discussed in the earlier memoirs, and shows that the *gametic* correlations form a series of the character $\rho, \rho^2, \rho^3 \dots$; in other words, a knowledge of the *gametic* character of the parents makes a knowledge of the *gametic* character of the ancestry unnecessary. Apart from symbols, this must be a truism, because the offspring arises solely from the gametes of the parents; but a point of some interest is that the Mendelian *gametic* correlations, whatever be the mixture of protogenic, allogenic, and heterogenic elements in the freely mating population, take the same values, i.e. 0.5, 0.25, 0.125, &c., diminishing one-half with each ancestral grade. These *gametic* correlations are much nearer to the values obtained by biometric investigations for the *somatic* correlations, the theoretical Mendelian *somatic* correlations being considerably too small. It would thus appear that the Mendelian *gametic* correlations accurately obey the fundamental conceptions of the law of ancestral heredity, and the only real outstanding antinomy lies in the principle of absolute dominance. The correlations found biometrically suggest that there is a closer relation between the *gametic* and *somatic* constitution—at least for certain characters in the species investigated—than is represented by the first Mendelian principle of absolute dominance.—The intracranial vascular system of *Sphenodon*: Prof. A. **Dendy**. This memoir contains a detailed description, with illustrations, of the intracranial